MISSOURI BOTANICAL GARDEN
green for 150 YEARS 1859–2009

Discoveries and Conservation

Discovery has always driven human progress. Our discoveries feed our collective knowledge, which in turn demands that we seek new discoveries. We face each new challenge with the expectation that we will discover a solution.

Discovery takes many forms in botany, and all of them inform the conservation and sustainable use of biodiversity.

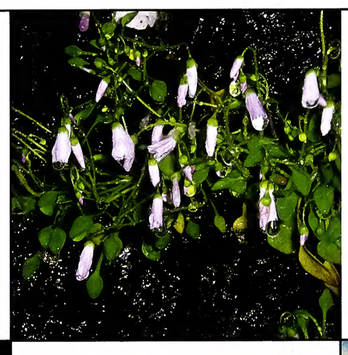
- Discovery can occur in the herbarium when a specimen collected many years ago but undetermined for its entire existence is found to be an undescribed new species, now requiring rediscovery in the wild.
- Discovery in the field can reveal the fruits of a species that had previously been known only in flower, which turn out to be a key food resource for one of our primate cousins.
- Discovery can reveal new localities of a rare species, in new countries quite distant from those where it was previously known, thus expanding its range and creating unexplained gaps to explore.

Knowing that a species exists, the role it plays in the ecosystem, and where it is distributed are critical pieces of information for its conservation. As discovery informs conservation, conservation ensures the persistence of discovery

–George E. Schatz

▼ ***Anthurium* sp.** This species of *Anthurium* from Pichincha Province, Ecuador, is a new discovery from a region only recently explored but already threatened with destruction. MBG botanist Thomas Croat, who collected the species, studies the Araceae family, characterized by having its flowers and fruits closely aggregated into a cylindroid structure (spadix) and subtended by a leaf-like structure (spathe). [T. Croat]

◀ ***Tetranema gamboanum* (Scrophulariaceae)** This species new to science described by MBG botanists Barry Hammel and Michael Grayum is not known from within any national park in Costa Rica. However, the original collecting locality—Tayni Indian Reservation, on the Caribbean slope—is one of the most isolated, inaccessible places in the country. Where otherwise collected on the Pacific slope, it forms healthy populations. It even does quite well in cultivation. [F. Morales]



◀ ***Claytonia ozarkensis*** Unlike the flora of the vastly underexplored tropics, the flora of the temperate zone in the United States is well known, making the discovery of a new plant species exceptional. *Claytonia ozarkensis* (Portulacaceae), the Ozark spring beauty—which botanists had previously mistaken for another species, *Claytonia caroliniana* (Carolina spring beauty), a more widely distributed relative—represents a unique example of a newly described species. Known from only a few sites in Arkansas, Missouri, and Oklahoma, *Claytonia ozarkensis* grows in crevices on the face of dry sandstone bluffs. MBG conservation biologist Matthew Albrecht is collecting seeds for *ex situ* conservation and conducting basic research on the species to better understand the factors that limit its distribution. [M. Albrecht]

▲ ***Sphagnum perichaetiale* (Sphagnaceae)** grows on the ground in bogs or wetlands throughout the world. However, MBG botanist Bruce Allen found it growing as a canopy epiphyte in Panama. Mosses are small plants with often modest roles in their ecosystems but can nevertheless be crucial indicators of special habitats. Discovery of extraordinary habitats is critical in sharpening conservation focus and framing strategic plans to maximize biodiversity. [B. Hammel]

◀ ***Xerophyta*** MBG botanists Peter Phillipson and P. Pete Lowry II are conducting a study of the genus *Xerophyta* (Velloziaceae), which contains nearly 20 new species in Madagascar—most with very narrow ranges. This species, found only at Andohahela National Park and a few nearby sites, will soon be named in honor of MBG botanist George E. Schatz. [P.P. Lowry II]

◀ ***Ancistrocladus korupensis* (Ancistrocladaceae)** Discovered in Korup National Park, Cameroon, and described by MBG botanist Roy Gereau and colleague Duncan Thomas, this species yielded an alkaloid demonstrating significant anti-HIV activity in National Cancer Institute tests. Continued conservation of Korup National Park is essential to its survival since it is considered Vulnerable (*) to extinction in the wild. [R.E. Gereau]

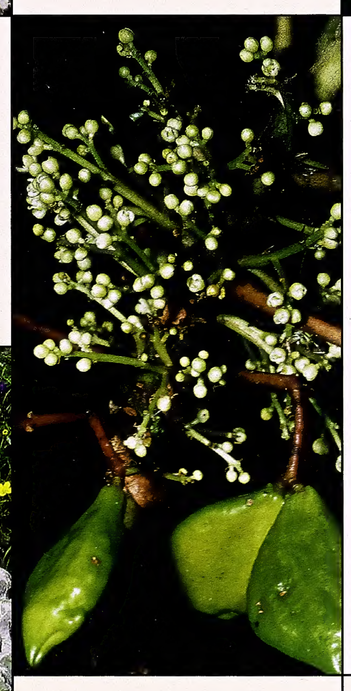
▶ ***Anthurium bittneri* (Araceae)** Rarely is a botanist in a position to recognize a plant at first sight as a new species, but when ecologist Jens Bittner returned to camp with a large, terrestrial aroid, MBG botanist Michael Grayum proclaimed, "*Anthurium bittneri*!" During many trips in Costa Rica and Panama, he had never seen such a plant. The species appears restricted to a small region of the Cordillera de Talamanca in Costa Rica, and its remote habitat has safeguarded it. [M. Grayum]

▼ ***Cuphea splendida var. viridiflava* (Lythraceae)** This uncommon yellow-flowered *Cuphea* is a rare endemic from Santa Cruz Department, Bolivia, and was described by MBG botanist Shirley Graham. Hummingbirds frequently visit for the abundant nectar that accumulates in the floral spur, while many insects—ineffective pollinators—are trapped in viscous secretions covering the flower and stems. [S. Graham]

▶ ***Parkia*** Most species in the genus *Parkia* (Fabaceae) are tall canopy trees with ball-like flowers frequented by bats, and most grow in hot, humid rain forest lowlands. MBG botanist David Neill and his team were therefore surprised to find a flowering, medium-height *Parkia* tree in cool mountain forests in the Cordillera del Cóndor in southern Ecuador. To confirm their theory that the species is new to science, they must return to the same tree to collect the ripe fruits. [D. Neill]

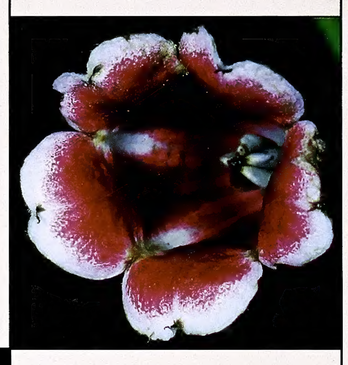
▶ **Orobanchaceae** After receiving a single, odd specimen, MBG botanist George Yatskievych identified an undescribed genus of the parasitic family Orobanchaceae that depends for water and food on the roots of a particular host tree. Restricted to a small region in Guerrero state, southern Mexico, it grows in small headwater drainages that deteriorate as adjacent pine-oak forests are lumbered or converted to agricultural or pasture land. [G. Yatskievych]

▲ ***Shangrilaia nana*** This new genus and species in the mustard family (Brassicaceae) was described by MBG botanist Ihsan Al-Shehbaz and Chinese colleagues Yue Jipei and Sun Hang. This small plant is known only from a small scree area near the summit of Shika Shan Mountain close to Shangri-La town, Yunnan Province, where tourism and skiing place the species at high risk. Only about 250 individuals are known. [J. Yue]



◀ ***Pohlidium petiolatum*** The discovery of new genera is inherently more exciting than the discovery of new species. MBG botanists have been responsible for many such discoveries. MBG botanist Gerrit Davidse and colleagues described a new genus, *Pohlidium*, unusual among the nearly 11,000 species of grasses in its combination of unisexual flowers, broad leaf blades, and long petioles, for which the species was named. This little rainforest grass, known only from a single, very wet gorge on the Río Tife in Coclé, Panama, grows on the vertical faces of large boulders in the shade of ferns. The rough terrain protects this species from immediate threat, but most new species discovered recently are very local or rare at any one locality—hence extremely vulnerable to extinction if their habitats suffer major changes. [Drawing: A.R. Tangerini]

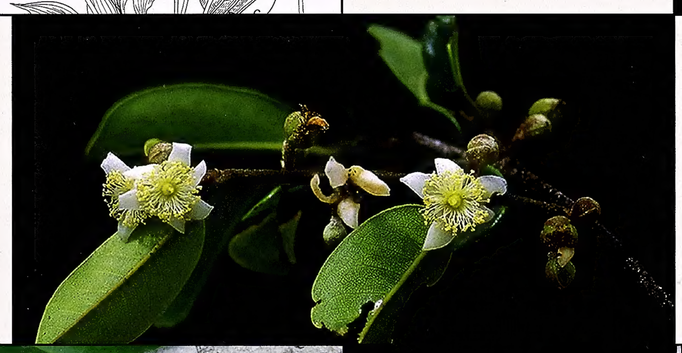
▼ ***Acranthera*** In Vietnam, a treasure trove of biological diversity, each new expedition reveals new species and records. MBG botanist Jack Regalado and Vietnamese collaborators surveyed the Annamite mountain range, a region seriously threatened by habitat degradation, and discovered two new and apparently endemic species of the genus *Acranthera* (Rubiaceae), which was not previously known to occur in Vietnam. [L.V. Averyanov]



▶ ***Saussurea laniceps*** An endemic medicinal plant, the snow lotus inhabits high alpine environments in the Himalayas. MBG botanist Jan Salick and graduate student Wayne Law compared specimens collected over the last century with individuals in wild populations and found that harvesting has dwarfed this plant almost 9 cm. This research illustrates the role of herbarium collections in facilitating conservation assessment and monitoring. [W. Law]

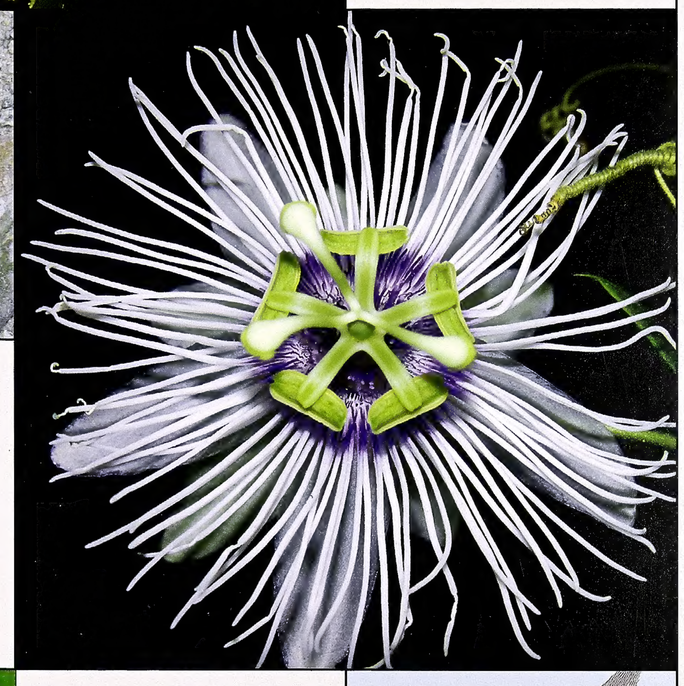
▲ ***Hooglandia ignambiensis*** Exploration on New Caledonia, a remote Western Pacific island, resulted in discovery of this new genus and species described by MBG botanists Gordon McPherson and P. Pete Lowry II. This tree's unique features made family classification difficult. Only an analysis of molecular sequence data finally placed it in the Cunoniaceae. Because only a few individuals are known, this species is considered critically endangered. [P.P. Lowry II].

▶ ***Schizolaena tampoketsana* (Sarcolaenaceae)** discovered in Madagascar in 1966 by French botanist René Capuron, was rediscovered and described by MBG botanists P. Pete Lowry and George E.Schatz in 1999. Critically Endangered (*)in the wild, this species is among the rarest trees in the world. It is known from fewer than a dozen mature individuals in several tiny forest fragments on the Ankazobe plateau. Several seedlings are now in *ex situ* cultivation. [G.E. Schatz]



▼ ***Passiflora* sp.** Among numerous interesting discoveries from the remote Madidi National Park in Bolivia is this passionflower (Passifloraceae) collected recently. This previously undescribed species is being named by family expert and Madidi project leader Peter Jørgensen. The occurrence of the species within the borders of the National Park guarantees its conservation only to a certain degree. [A. Araujo]

▶ ***Mucoa duckei*** During an expedition to the Río Vaupés, Colombia, MBG botanist James Zarucchi first collected a tree with thick, sticky, white sap and large aromatic fruits in the dogbane family (Apocynaceae). He later described it as a new genus—*Mucoa*—with two species. Pictured is *Mucoa duckei*, a species of medium-sized trees known from scattered locations in the Amazon Basin. [J. Zarucchi]



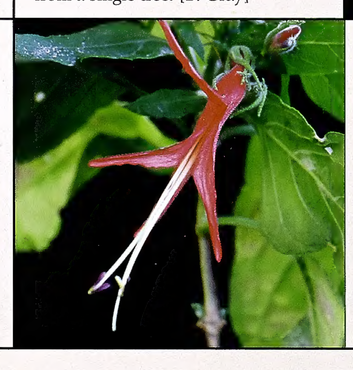
▲ ***Mutisia magnifica*** MBG botanists Carmen Ulloa and Peter Jørgensen found and described this vine in the sunflower family (Asteraceae) with a spectacular hanging inflorescence about 15 cm long. Endemic to the Andes Mountains of Ecuador, it is known from one small area just outside the city of Loja. This threatened species occurs in vegetation remnants imperiled by wood extraction for charcoal production. [C. Ulloa]

◀ ***Phitopis*** The unusual flower structure of this tree in the coffee family (Rubiaceae) puzzled MBG botanist David Neill, who collected it in the remote sandstone plateaus of the Cordillera del Cóndor in Ecuador. It took some detective work in the herbarium by MBG botanist Charlotte Taylor, who specializes in the taxonomy of this family, to conclude that the specimens were a new species of the little-known genus *Phitopis*. [D. Neill]

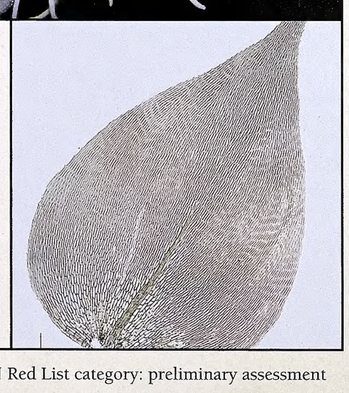
▲ ***Pleurothyrium*** Most South American species of Lauraceae have fruits seated in cups, like acorns. The fruits of this undescribed species of the genus *Pleurothyrium* are seated in very shallow cups with widely flaring rims. The species is known only from the Cordillera del Cóndor—still poorly known botanically—where MBG botanist Henk van der Werff and collaborators first collected it in 1994 and then in 2006 from a single tree. [B. Gray]

▶ ***Calceolaria oxapampensis* (Calceolariaceae)** First collected in 2003 by MBG botanist Rodolfo Vásquez and collaborators, this species is an attractive herb growing on riverbanks in the Oxapampa region, central Peru. Restricted to Yanachaga-Chemillén National Park and its buffer zones, the species is threatened by cattle ranching and agriculture. [R. Vásquez]

▶ ***Anisacanthus nicaraguensis*** *Anisacanthus* is a genus of Acanthaceae with large, hummingbird-pollinated flowers. The genus has about 20 species, mostly in northern Mexico and adjacent Texas and in South America, as well as two rare species endemic to Mesoamerica, one in Honduras and El Salvador and one in Nicaragua. The Nicaraguan endemic, which is Critically Endangered (*), was discovered in 1985 and described as a new species in 1999. Despite repeated searches, the species remained lost until 2008, when MBG botanists W.D. Stevens and Olga Martha Montiel discovered a second population and again located the original population, now reduced to a few individuals. With its beautiful flowers, this species, on the brink of extinction, may gain a second chance in horticulture. [O.M. Montiel]



▶ ***Plagiothecium shevockii* (Plagiotheciaceae)** Bryologists spend long hours at the compound microscope to accurately describe moss structures. Collected by James Shevock within a national park northwest of the summit of Snow Mountain (Hsuehshan) in a juniper and rhododendron forest, this new moss species from Taiwan was described by MBG bryologist Si He. [S. He]



* IUCN Red List category: preliminary assessment

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Founded in 1859, the Missouri Botanical Garden was established "for all time for the public good" by Henry Shaw, a prominent St. Louis businessman. Inspired by the gardens of his native England and guided by the eminent botanists of his day, Shaw founded the Garden to be a center for education, scientific research, and horticultural display.

Today, the Garden has one of the world's most active research programs in science and conservation, with 46 Ph.D. researchers working in 36 countries around the globe. Every day, these intrepid scientists wrestle the elements to document the world's dwindling flora. New species are discovered almost daily, but discovery and documentation are not enough in the face of habitat destruction and global climate change.

The scientific work of Missouri Botanical Garden researchers is the basis for plant conservation in many countries. Community-based efforts empower local populations to protect their natural resources, thus protecting biodiversity, the web of life, and the future for us all.

Watercolor portrait of Henry Shaw beside the Museum Building, circa 1859, by Emile L. Herzinger.

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